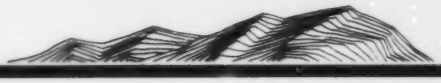
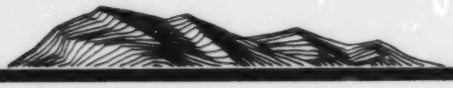


Forest Landscape Management Strategies for Alberta

Alberta
FORESTRY,
LANDS AND WILDLIFE
Forest Service



91-02245/

Pub. No. T/228
ISBN: 0-86499-756-6
(Revised 1990)
Original Printing 1986

FOR ADDITIONAL COPIES OF THESE GUIDELINES, CONTACT:

Information Centre
Forestry, Lands and Wildlife
Main Floor, Bramalea Building
9920 - 108 Street
Edmonton, Alberta, Canada T5K 2M4

Telephone: (403) 427-3590

Contents

Page

1. Introduction 3
1.1 Forest Landscape Management Ground Rules 5

2. Visual Resource Inventory 6
2.1 Visual Sensitivity Factors 6
2.1.1 Landscape Scene 6
2.1.2 Visual Perception 8
2.1.3 Social Sensitivity 11
2.2 Visual Sensitivity Rating 12
2.3 Inventory Procedures 13

3. Visual Quality Objectives 15

4. Visual Impact Assessment 17
4.1 Visual Absorption Capability 18
4.2 Assessment Techniques 20

5. Visual Management Actions 23
5.1 Design and Layout 24
5.1.1 Lineal Disturbances 25
5.1.2 Screening 27
5.1.3 Cutblock Shapes 30
5.1.4 Opening Size 33
5.1.5 Cutting Systems 34
5.1.6 Timing 36
5.2 Operations 38
5.3 Follow-up Treatments 41
5.4 Effect of Time 46

6. Resource Management Decisions 47

Appendices 49
1. Physical Elements of a Viewshed 50
2. Visual Perception 53
3. Human Factors 54

Glossary 55

References 57

List of Illustrations

Figure	Page
1. Landscape Assessment Model	5
2. Distance Zones	9
3. Angle of View	10
4. Landscape Sketch	20
5. Alternative Cutting Systems	23
6. Effects of Screening	27

Map	Page
1. Land Classification Map	vi
2. Landscape Inventory	14

List of Tables

Table	Page
1. Visual Sensitivity Rating	13
2. Visual Quality Objectives	15

Foreword

The Forest Landscape Management Strategies are the result of an identified need to improve visual quality of timber harvesting operations and other industrial activities. The management of the visual resources in areas of high public use and areas valued for their scenic quality is of particular concern.

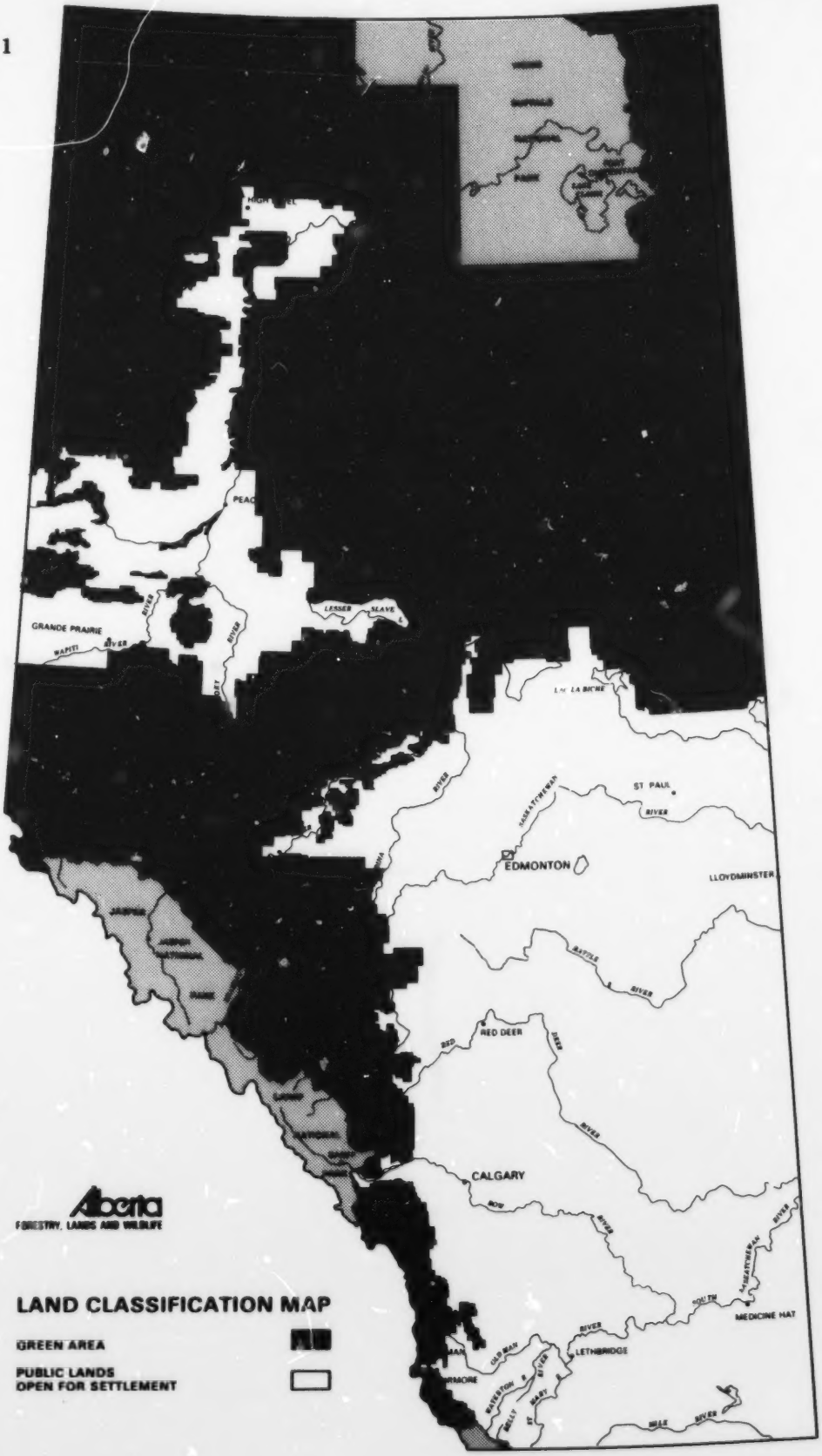
Many of the concepts and principles presented in these guidelines have been adopted from those proven by the U.S. Forest Service and the British Columbia Ministry of Forests and Lands. Their programs have greatly influenced the development and direction of the Alberta Forest Service program.

The Forest Landscape Management Guidelines seek to demonstrate the strategies that may be used for the integration of landscape management with other resource concerns. These guidelines shall play an integral role in good forest resource management, and will assist resource developers and managers in identifying areas where forest landscapes have aesthetic importance.

The interest and commitment for wise use of our forest resources that is found in industry and government agencies at every level within the province has helped shape the program of Forest Landscape Management in Alberta and will ensure its success.

C. B. Smith
Deputy Minister
Alberta Forestry, Lands and Wildlife

MAP 1


EDMONTON
CALGARY
RED DEER
LETHBRIDGE
MEDICINE HAT
LLOYDMINSTER
ST PAUL
GRANDE PRAIRIE
Alberta
FORESTRY, LANDS AND WILDLIFE
LAND CLASSIFICATION MAP
GREEN AREA
PUBLIC LANDS
OPEN FOR SETTLEMENT

Forest Landscape Management Strategies for Alberta

Foothills — Bow/Crow Forest

1. Introduction

The landscapes of Alberta present both constant and ever-changing contrasts. The open expanses of the prairie yield to forested, rolling foothills, and the dense canopy of the northern forest; treed slopes yield to the impressive barren backdrop and enclosure of the Rockies.

Scenic appeal is not limited to natural features; cultivated fields, for example, can contribute to landscape quality. Cultured landscapes, influenced by land use and structures, are familiar to everyone.

People see landscapes in different ways, and place different values upon them. The naturalist or wilderness seeker finds enjoyment and satisfaction in areas unchanged by man. For the adventuresome, the attraction of a feature is its challenge; the mountain to the climber or skier, the wild river to the kayaker. For many, the attraction of these same landscapes is increased when access and facilities are provided.

Landscapes are constantly changing, through both natural events and human actions. The viewers' acceptance and understanding of landscape changes are influenced by their memories and expectations for the area, and their sense of how well an alteration fits within the landscape.

As recreational use of the forest land is increasing, so is the demand for extraction of resources such as timber, oil, gas and minerals. To underestimate the potential visual impacts of these activities can result in loss of scenic values; to overestimate them can lead to undue restrictions.

The landscape is an element which must be considered at all stages of resource planning and development in Alberta. To do this, sensitive landscapes must be identified, their quality rated and their ability to withstand change determined.

These guidelines will assist resource planners and managers in integrating, reconciling and harmonizing forest resource use within visually sensitive areas.

Planning for resource management involves progressive refinement of management decisions, from the broad policy level down to specific management tasks. At each stage, visual resource information must be available at the appropriate level of detail. With each decision, future options become less flexible.

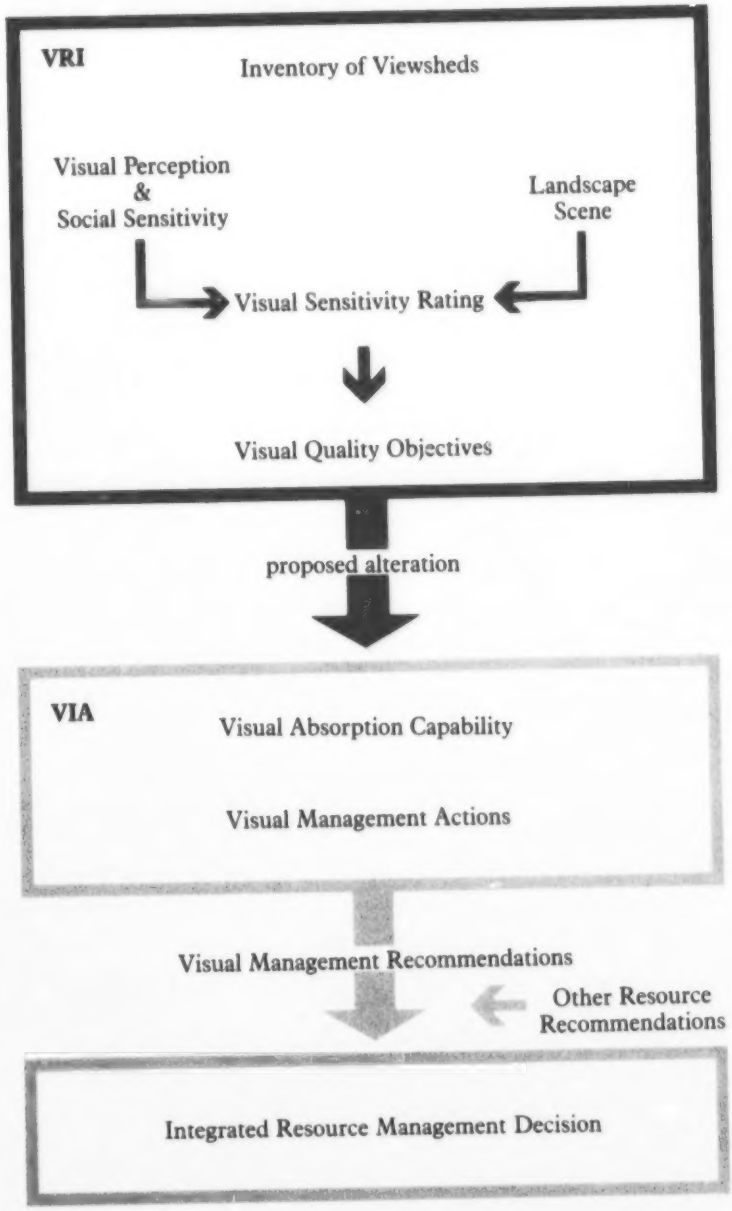
Resource development in Alberta takes place under environmental regulations and guidelines which benefit the visual resource. Several handbooks identify specific requirements for protection of aesthetic values. Among these are *The Resource Road Planning Guidelines, The Resource Handbook, Timber Harvest Cutblock Design, and Watershed Assessment Manual.*

Forestry operations are managed in a manner that generally protects landscape quality. Smallwood utilization, winter operations, slope operability limits, mandatory reforestation and thorough reclamation requirements can minimize adverse effects on the visual environment.

The Forest Landscape Management Policy requires consideration of visual resources. Together with the Timber Harvest Planning and Operating Ground Rules the policy provides encouragement and direction to Alberta Forest Service and industry.

Kakwa Falls — Grande Prairie Forest

FIGURE 1



LANDSCAPE ASSESSMENT MODEL

1.1 Forest Landscape Management Ground Rules

1. The Forest Landscape Management Policy shall apply in visually sensitive areas.
2. The Forest Landscape Management Guidelines shall be used to identify visual resources, their sensitivity and vulnerability, and to set objectives for their management, when in place.
3. In visually sensitive areas, the guidelines shall be applied to help determine the visual impact potential of proposed harvest operations.
4. In harvest operations with significant potential for visual impact, the guidelines shall be applied during the appropriate planning, operational, and post harvest treatment phases to help avoid or mitigate adverse visual impact inconsistent with visual management objectives and good forest management practices.

Visual resource management begins with the assessment of landscapes, using suitable standards and techniques as defined by these guidelines.

For areas where forest landscapes have aesthetic importance, assessments can be conducted in varying degrees of detail, from broad inventory (Chapter 2) to detailed assessment (Chapter 4). The Forest Landscape Guidelines describe these methods and the factors which must be considered in making landscape management recommendations.

2. Visual Resource Inventory

The objective of landscape assessment is to record the visual landscape and identify the factors which contribute to its scenic value and significance.

The visual resource inventory (VRI) is a quick and simple process of recording the expanses of viewable area on topographic maps, noting the key features, their prominence and sensitivity in the view.

The inventory may be broad, as for an entire travel corridor or viewshed, or may be tailored to a specific landscape unit which is to be assessed.

Inventory should be done in advance of resource development decisions, so that comparative landscape values can be assessed and management strategies worked out before commitments are made.

In order to conduct the inventory, one must have an understanding of the factors that create visual sensitivity in a landscape.

Northern Alberta Landscape

East Slopes of Alberta

2.1 Visual Sensitivity Factors

Visual sensitivity is a measure of the prominance and importance of a landscape.

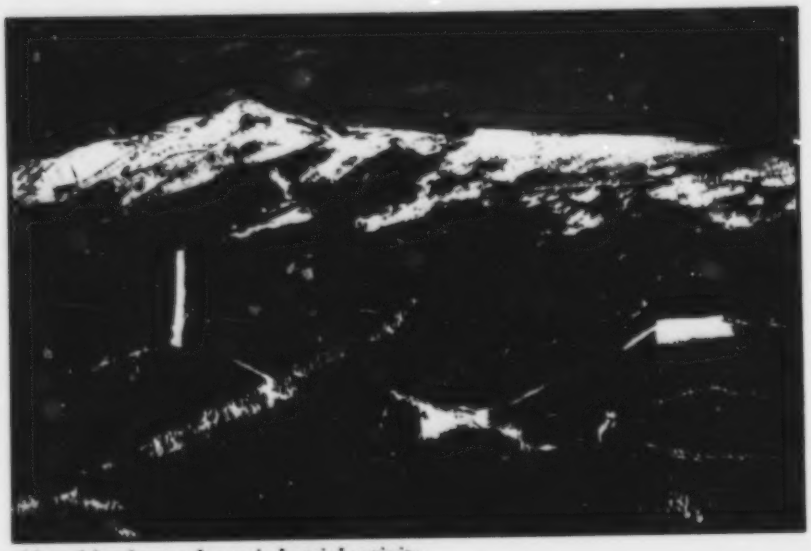
Sensitivity Factors fall into three categories:

1. Landscape scene characteristics.
2. Visual perception conditions.
3. Social sensitivity.

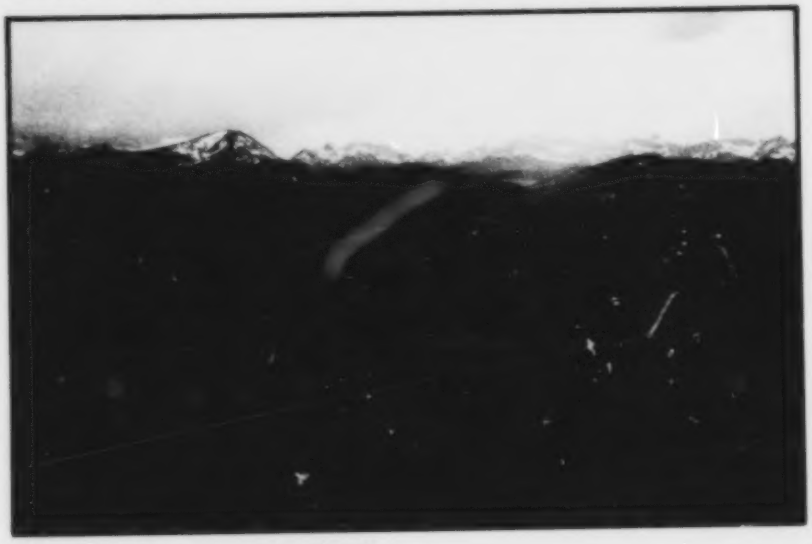
In combination these form the visual sensitivity.

2.1.1 Landscape Scene

The landscape scene is the viewable area, also called the viewshed, as it appears from one or more viewpoints. A viewpoint may be stationary or any point in a corridor along which the viewer travels (refer to



Altered landscape due to industrial activity.



Natural openings can create variety in a landscape.

Appendix — Fixation and Sequence Process).

Individual features may be attractive in themselves, or appear prominent because of their position or arrangement.

Landscapes with a variety of features are generally more interesting and therefore visually sensitive. As well, such landscapes are usually more able to absorb modification by land uses. This is an important factor in visual impact assessment, to be discussed under Chapter 4.

Each region of Alberta has characteristic landscapes with special qualities and appeal. Assessment of the sensitivity of a landscape takes into account its location and surroundings. For instance, a lakeside in the north-eastern corner of the province may not be as great an attraction as a mountain lake in the Rockies, yet its character, uniqueness in its surroundings and the interest of its users may make it highly sensitive.

The scenic quality of landscape is influenced by its existing condition. Nature continually alters the landscape. As well, human activities change the landscape through resource use, settlements and industry, recreation opportunities and transportation. Alterations may include new or improved access and increasing the number of users, thus raising sensitivity.

The arrangement of landscape elements can add emphasis by creating focus, panoramas or confinement (refer to Appendix — Physical Elements).

Landscapes with variety in land form, rock form, water form or vegetation can add interest. However, a landscape that is too complex may be less attractive and, in some instances, may be seen as having deteriorated in quality (e.g., excessive cutblock size).

Variable or ephemeral conditions can greatly affect landscape perception. These include light, weather and movement.

Weather conditions such as rain, wind, lightning, snow, fog and temperature: all affect landscape quality and appreciation.

Each temporary condition such as wetness, dryness, running water, frozen ground and snow accumulation has an influence on the appearance of the landscape, its colours, reflections and contrasts.

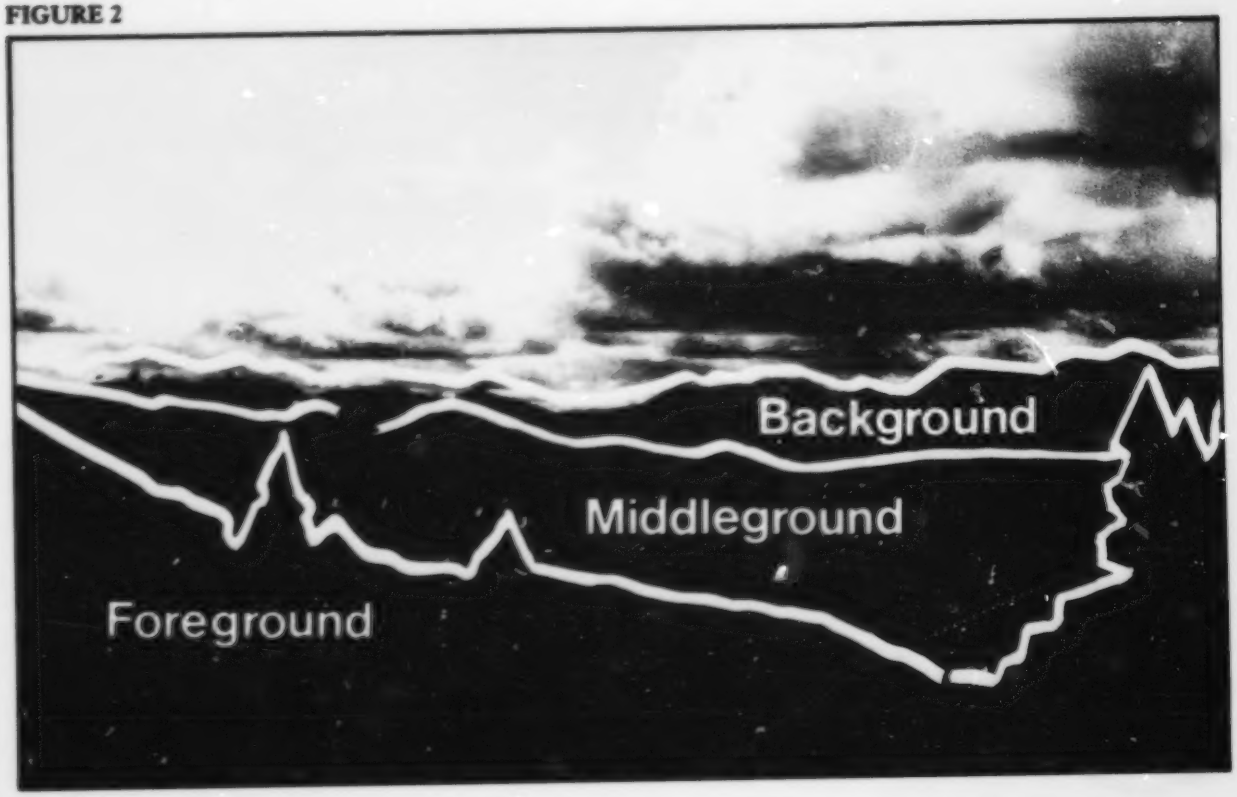
Sounds of rushing water, wind in the trees, wildlife, machines, industry, traffic and people can strongly influence the visitor's experience.

Ephemeral Conditions (Mist/Haze/Fog)

2.1.2 Visual Perception

Visual sensitivity is affected by the limits of visual perception; that is, the physical and mental interpretation of how much the eye can see. Easily measured factors which relate to perception are the distance between the viewer and the feature, the angle of view, intersection with the landscape, and blockage of view created by visual screening.

FIGURE 2



Distance Zones

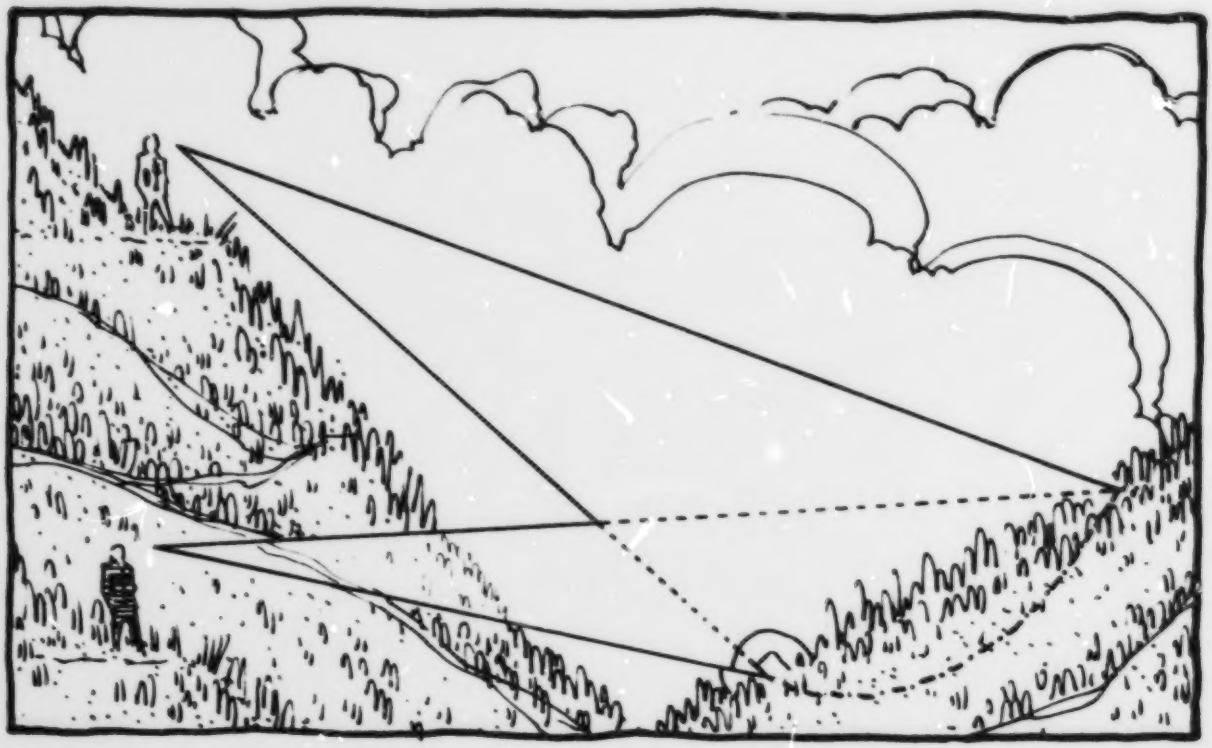
1. *Foreground* — usually considered to be the first few hundred metres of view, sometimes up to about 1 km. Fine detail is apparent, the viewer is in the scene and can feel a size relationship with its elements. Perception of colour is greatest; other sensory experiences (sound, touch, smell) are the most acute. Wind motion is seen.

2. *Middle Ground* — ranging from 1 km to about 8 km. Overall shapes and patterns begin to emerge, individual trees are now seen as stands, and the relationship between landscape units can be discerned. Variations of light and atmospheric quality can either soften or exaggerate colour contrasts. The middle ground zone is often the most difficult to work with.

3. *Background* — from about 8 km to infinity. The scene is strongly influenced by atmospheric quality, little texture or detail is apparent, and entire landscape units are seen. As distance increases, individual impacts are less apparent.

SOURCE: USFS, Forest Landscape Management

FIGURE 3

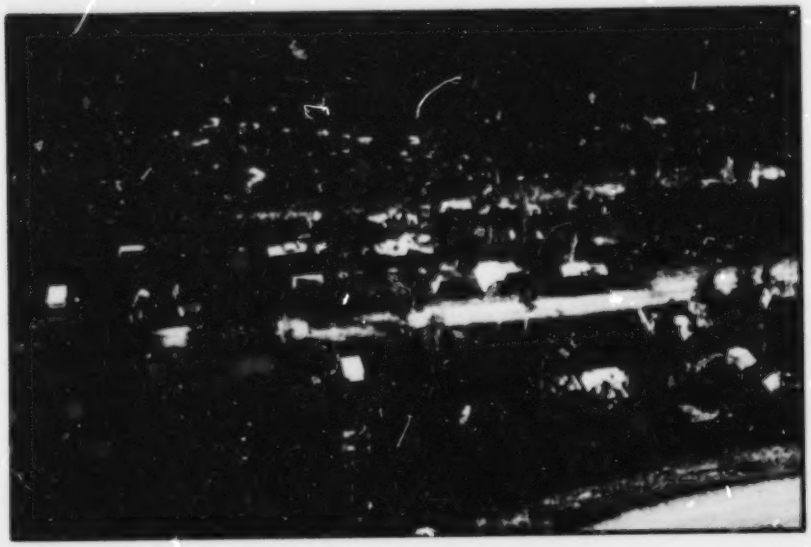


Angle of View

The position of the viewer in relation to the angle of the slope influences perception. How much viewers can see, and their perception of it, depends largely on this position. From an elevated viewpoint, much can be seen. "Maximum opportunities are present for distance views or panoramas, visual blockage is least restrictive" (USFS, Forest Landscape Management). At a lesser angle in relation to the land plane, perspective foreshortening reduces the scale of what is seen. The same effect occurs as the alteration moves away from view horizontally (refer to Appendix — Observer Position).

Screening of View

Viewer perception can be limited by buffers or screens. Attention can be indirectly focused to certain points or views in a landscape (refer to Screening — page 27).



2.1.3 Social Sensitivity

The social component of viewer sensitivity for an area is a combination of a number of factors:

- the number of visitors or users;
- their length of stay;
- their level of concern for scenic quality;
- their knowledge of an area.

Communication with local user groups can help define the level of concern (refer to Appendix — Evaluating Landscapes).

2.2 Visual Sensitivity Rating

The scenic quality features, perceptual and social factors which have been discussed combine to produce the visual sensitivity of a landscape (refer to Appendix — Human Factors).

A three-class rating system separates distinct landscape units and provides some direction on the degree of caution required in developing land uses. The classes are broad and their limits are not rigidly defined, therefore they will overlap or merge during landscape assessment.

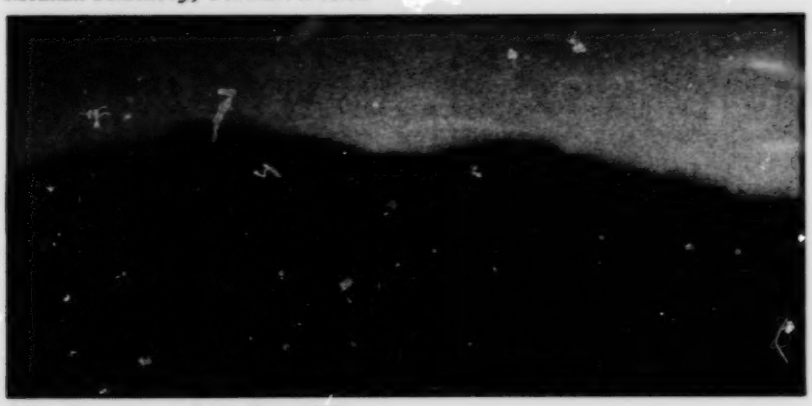
The ratings serve as "red flags" to identify visual resources for which further consideration is needed.

Features in the landscape may be unique or special for their own character, or may attract attention because of their position. For example, focal slopes in the line of sight are seen by viewers driving a highway; features adjacent to sites where people spend time (recreation sites, rest stops, lakeshores) are highly rated. Other attractions include variations in topographic relief and features of dominant scale: broad views, Rocky Mountain massifs, lakes.

VISUAL SENSITIVITY RATINGS

High Quality Landscape — High Sensitivity

Quality Landscape, Medium Sensitivity, Common to Area



Low Concern — Low Sensitivity

2.3 Inventory Procedures

The method of conducting an inventory of visual resources is set out in the following steps.

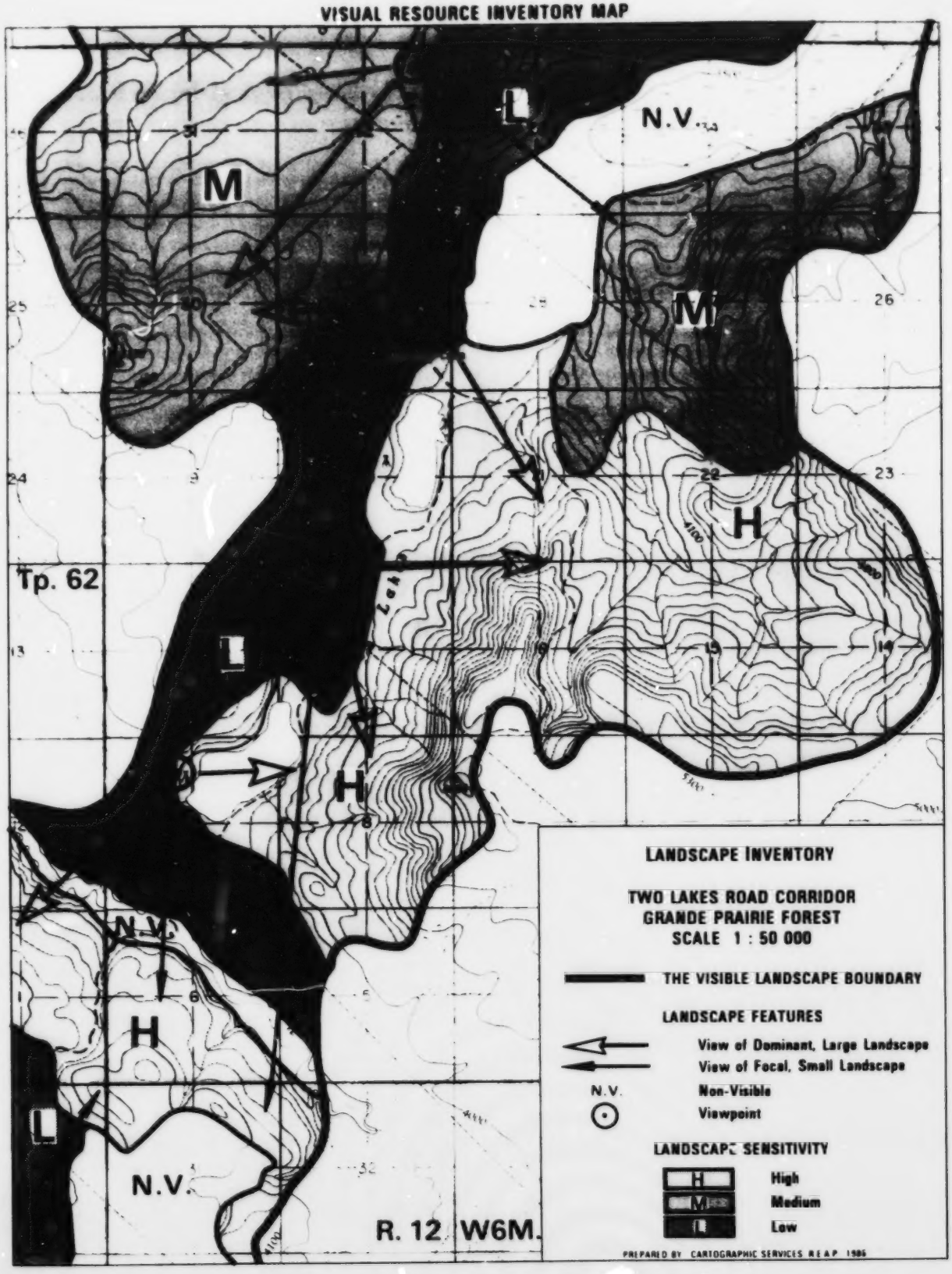
1. Select the corridor, viewshed or landscape unit of interest.
2. Obtain aerial photographs and topographic maps to cover the expected extent of the viewshed. The NTS 1:50 000 topographic maps provide acceptable detail for orientation. 1:15 000 maps may be used for small units.
3. Map the boundary of the viewable area, as seen from vantage points and along entire travel corridors. Non-visible areas within the boundary are to be delineated and marked nv.
4. Indicate key features with arrows. Key features include dominant large landscapes, focal small landscapes and features that are unique or likely to attract attention.
5. Rate the visual sensitivity of the landscape, within the mapped viewable area boundary. This requires some judgment and "feel" for the entire area and its component parts, the landscape units. A unit can be large or small, but is distinguishable from its neighbors by characteristics in any of the three categories that create visual sensitivity.
6. Obtain photographs from key viewpoints. Panoramas can be recorded with overlapping shots.
7. Make written comments on the key features, the viewing opportunity and the existing visual condition of each major unit. If improvements in access are planned, the expected increased use and effect on visual sensitivity must be taken into account.
8. Provide the inventory map to resource planners and managers to help guide the allocation and structure of resource development in key sensitive areas (page 14). Landscape sensitivity rating provides a flagging of the more critical areas. It also reveals areas not in need of visual management considerations.

TABLE 1
Visual Sensitivity Ratings

HIGH	—Directly seen in near view —Dominant in more distant view —High quality landscape —Unique or high feature interest —Viewers stay long, have high concern, are many in number
MEDIUM	—In clear view or close —Less interest or dominance than high —Viewing opportunity creates less concern —Quality landscape, but common to area
LOW	—Viewed from distance low prominance in the view —Low concern —Viewed obliquely and/or briefly while travelling —Low quality or monotonous landscape

MAP 2

VISUAL RESOURCE INVENTORY MAP



3. Visual Quality Objectives

On completion of the visual resource inventory, broad objectives for visual resource management can be established. To aid in integrated resource planning these objectives, known as VQOs, set limits to the form and scale of visible alteration considered acceptable to the average visitor. In general, the greater the visual sensitivity, the more restrictive should be the Visual Quality Objective.

Visual Quality Objectives may also have an influence on resource availability and the rate and sequence of utilization. The actual effect of a particular VQO on resource development, if any, is determined through visual impact assessment (Chapter 4).

Two additional objectives are designed to either establish or re-establish the desired level of visual quality (enhancement and rehabilitation).

The final VQOs, which are adopted after other resource needs and constraints are taken into consideration, may differ from the recommended VQOs.

TABLE 2
VISUAL QUALITY OBJECTIVES

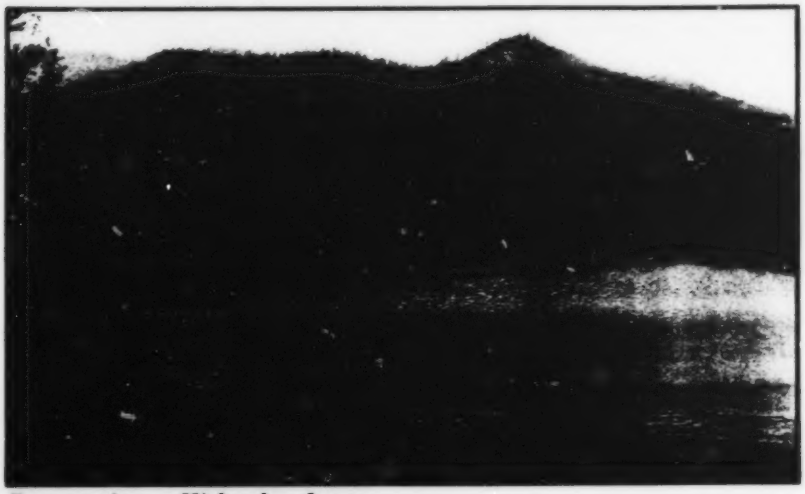
P	preservation	No activity, allow for ecological changes only. Applied in special management areas, zones or, on a smaller scale, to high value feature landscapes such as shoreline recreation sites and buffers, etc. Management implication may range from long-term retention to full protection.
R	retention	Activities not visually evident, repeat form, line, colour and texture found in the characteristic landscape. Change in size, amount, intensity, and direction should not be evident.
PR	partial retention	Slightly altered, activity natural appearing and subordinate to the characteristic landscape, though it may introduce contrast.
M	modification	Activity may visually dominate, but borrows from the forms, lines, colour, or texture of the characteristic landscape such that its visual characteristics are of natural occurrences within the surrounding area or character type.
MM	maximum modification	Activity may dominate the characteristic landscape, may be out of scale or contain detail which is incongruent with natural occurrences, but is viewed as natural when in the background.

SOURCE: USFS, National Forest Management, Vol. 2

Two short-term management goals may also be determined.

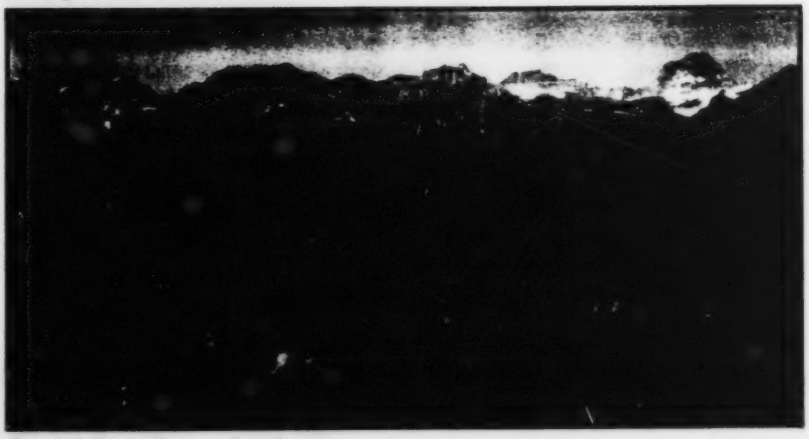
ENH	enhancement	Improvement of existing visual conditions.
REH	rehabilitation*	Directed at site recovery.

*The visual condition of altered landscapes can be tracked over specified time periods (e.g., one year, five years, 20 years). The acceptable period to meet a given VQO will vary but must appear reasonable, i.e., the more restrictive the VQO the shorter would be the recommended recovery period.



***Preservation** — High value, feature landscape, no activity allowed.*

***Retention** — Focal landscape, activity should not be evident.*

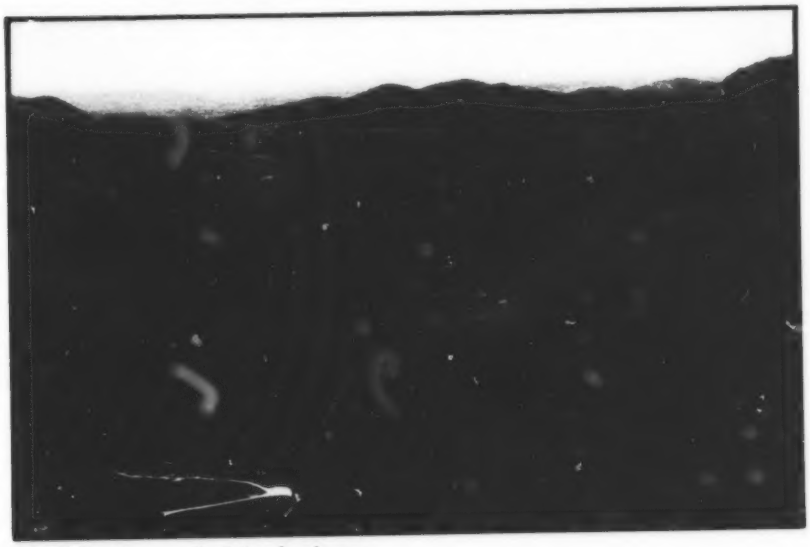


***Partial Retention** — Landscape presently altered, activity is subordinate and blends well.*

Preservation might be properly defined as long-term retention, because visual resource values may not always persist and other resources may take priority at a later date.

The term Maximum Modification does not mean that the visual quality of a landscape should be modified to the maximum. It does indicate that in some areas resource development may dominate and landscapes may be greatly altered. This could apply in areas where resource activities are already dominant, or where landscapes are common and levels of concern are low. Visual resource inputs to decision-making will be relatively minor, allowing increased attention to more sensitive areas.

With the setting of a Visual Quality Objective, the landscape assessment process for an area may be terminated, or, as projects are proposed, the Visual Impact Assessment, Chapter 4 can be applied to specific landscapes.



***Modification** — Activity dominates, but borrows from the characteristics of the landscape.*

***Maximum Modification** — Activity dominates, is out of scale — but appears natural when viewed in background.*

4. Visual Impact Assessment

When alterations to a visually sensitive area are proposed, a Visual Impact Assessment (VIA) should be conducted.

The VIA estimates visual impact potential, a measure of the contrast caused by alteration of the landscape. In doing this, the most important factor to be considered is Visual Absorption Capability (VAC), the capacity of the landscape to absorb alteration without visual impairment. The ability of the landscape to recover over time is also a valid and important factor.

4.1 Visual Absorption Capability

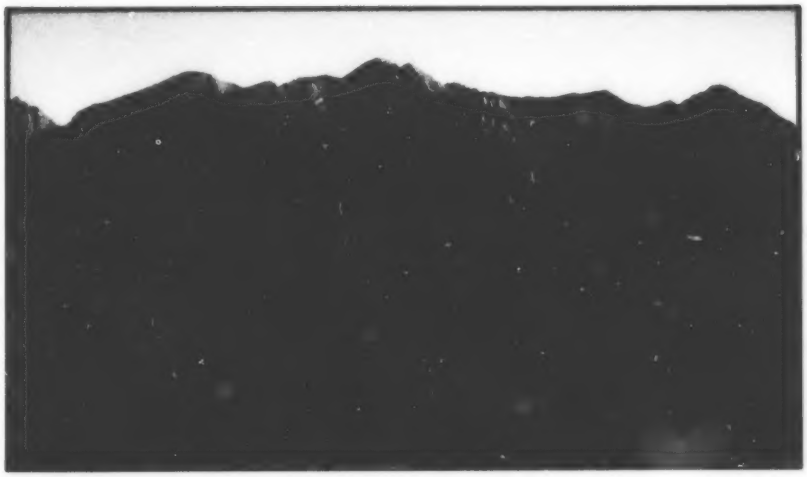
Visual Absorption Capability (VAC) is affected by the interaction of three types of factors:

1. The character of the existing landscape, its complexity of form, line, colour and texture;
2. Perceptual factors including distance, angle of view screening; and
3. Productivity of the site, which indicates its potential to recover and recovery rate.

An assessment of the visual vulnerability of the landscape to being altered will provide data to help determine whether the project is acceptable as proposed, needs modification or should be abandoned.

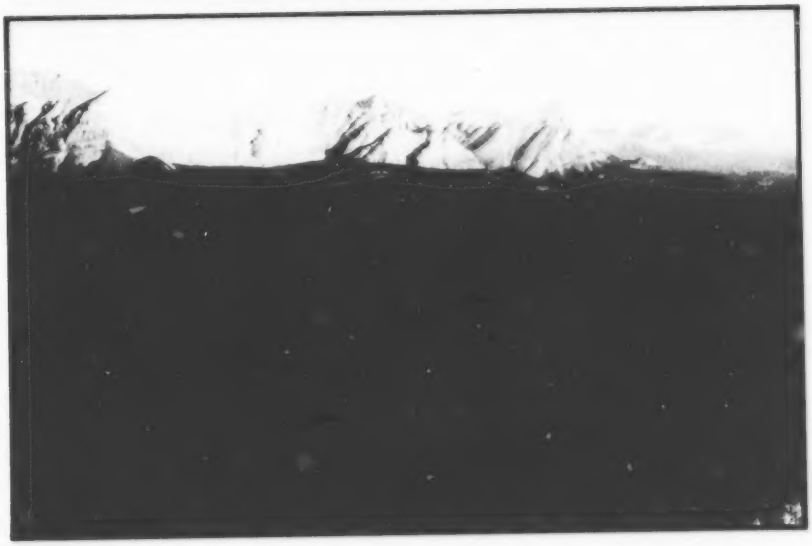
The expected degree of contrast, determined by field observation and office evaluations, can be categorized as high, moderate or low.

Reliability of the judgment will be related to the quality of information on the physical resource and the social sensitivity, as well as the experience and preferences of those doing the assessment, and consideration for the groups they represent. Bias and imbalance may be avoided by using a representative team.



***Enhancement** — Improvement of existing visual conditions.*

***Rehabilitation** — Recovery of site over time.*



HIGH VAC

— complexity of vegetation, topography and surface patterns, lines, colours, textures — land use modifications may already be present in the view.

— modification will be subordinate, low contrast

— low visual magnitude, land surfaces are seen at acute angles, vertically and/or horizontally

— effective visual screening

— rapid recovery possible

LOW VAC

— uniformity of surface colour and texture

— no existing alterations in view

— high relief or visual magnitude, direct view

— little or no screening

— modification will be dominant in the view or have high contrast in form, line, colour, texture

— slow recovery

4.2 Assessment Techniques

The most obvious way to examine the proposed alteration for its visual impact potential is by direct observation.

If an inventory of the visual resource has not yet been conducted, it will be necessary:

- from key viewpoints, to assess the scenic character, the perceptual limitations, and the viewing distance; and
- to determine the social sensitivity of the site by present use and types of users.

Once the above data has been collected, it will then be possible to:

- assess the scale of the proposal and the contrasts it will create in form, line, texture, colour and pattern with the existing landscape;
- locate the proposed alteration in the landscape by matching landscape features such as rock outcrops, meadows and timber type changes on aerial photographs with the same features in the view; and
- also note existing patterns of alteration such as cutblocks and seismic lines.

Sketching

The main forms and lines of the landscape and some of the variety, such as forest type change and existing openings, can be quickly recorded on sketches. The proposed shape and position of the alteration can be estimated and drawn.

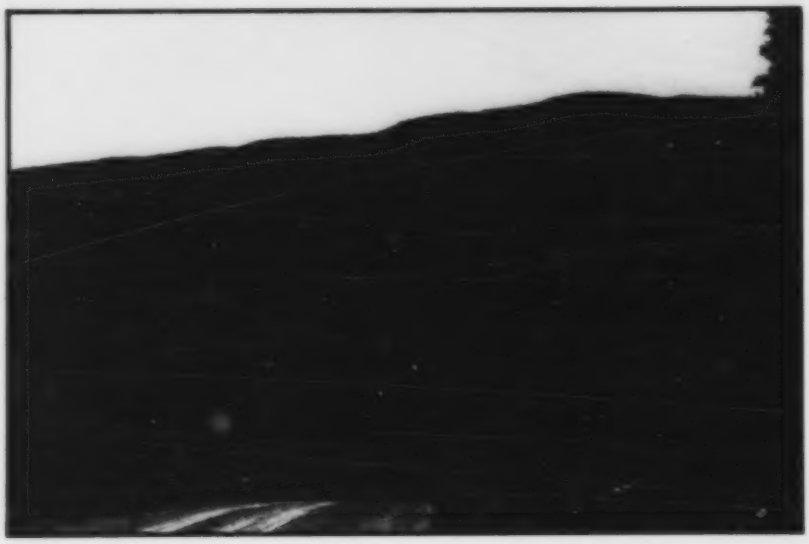


FIGURE 4

Photography

A photographic record of existing visual conditions may be compared with future conditions to see if the visual quality objective has been achieved. As well, photographs show the detail and arrangement of components in the view and allow the assessment process to be continued back at the office.

Broad panoramas can be recorded by taking a series of overlapping photos. These can be put together to display the full breadth of the view.

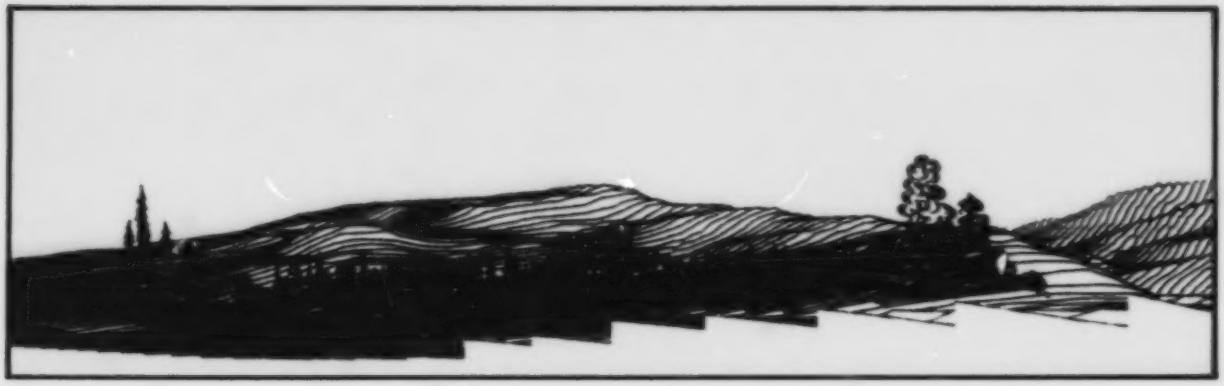
As with sketches, photographs provide a quick simulation of the important elements of the landscape and, through the use of overlays, the expected appearance of the alteration.

Photographic slide projections are excellent means for displaying and using landscape information. When the image is projected on flip-chart paper, the important elements can be marked and the alteration approximated. This process is especially effective in the development and testing of design alternatives.

For more convincing simulation, photos can be retouched. Retouching may require the services of an artist, particularly when the photos are for public presentation.

Kiosk — Pierre Greys Lakes — Edson Forest

For timber operations, long-term plans such as Timber Management Plans and cruise order maps are good sources of information. Photo simulations of the view, showing stages of cutting over a period of years and the effect of regrowth, or "green-up" can be placed on an information kiosk at the site.



Computer Simulations

Computer systems are now available to translate planimetric data from topographic maps and planning maps into perspective views of the landscape and planned alterations as they would appear from given viewpoints. One such program in use by the Timber Management Branch is called DTM, referring to the Digital Terrain Model it creates from normal topographic maps.

Computer simulation has many advantages. It is not affected by weather and travel conditions, and areas can be rapidly assessed from any number of viewpoints. Study can focus on either single projects or on land use over a large area.

The visible portions of the proposed activity and the landscape itself are determined, and the screening effect of vegetation surrounding the proposed alteration is indicated.

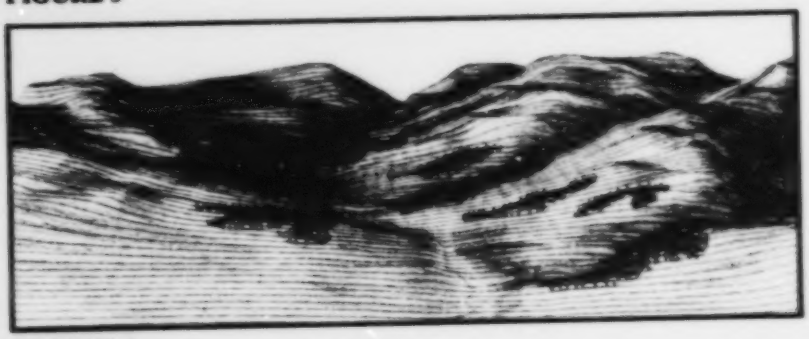
Drawings produced by DTM, especially if enhanced with colour, are convincing simulations.

The appearance of alternative designs can be quickly assessed by DTM. This capability is most important in a design workshop situation, particularly when participants have the knowledge and responsibility for technical feasibility and field layout.

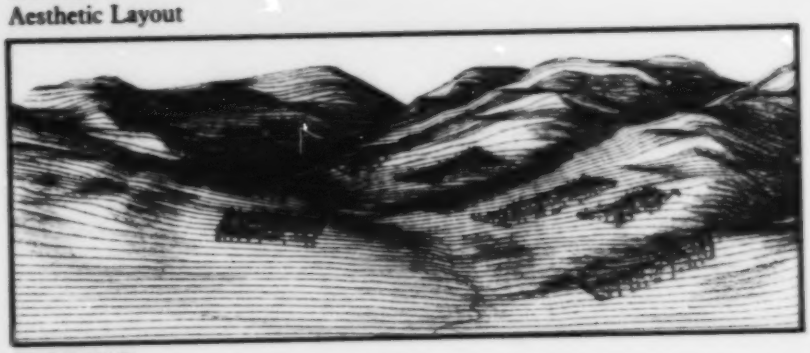
Planimetric detail such as roads and cutblocks can be superimposed on the resulting perspective.

Maskuta Creek — Edson Forest

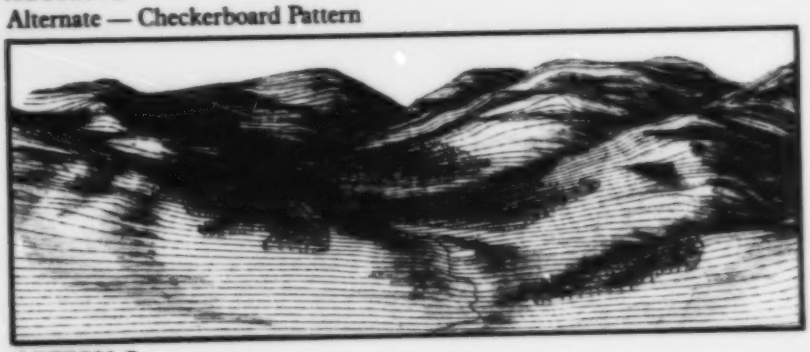
FIGURE 5



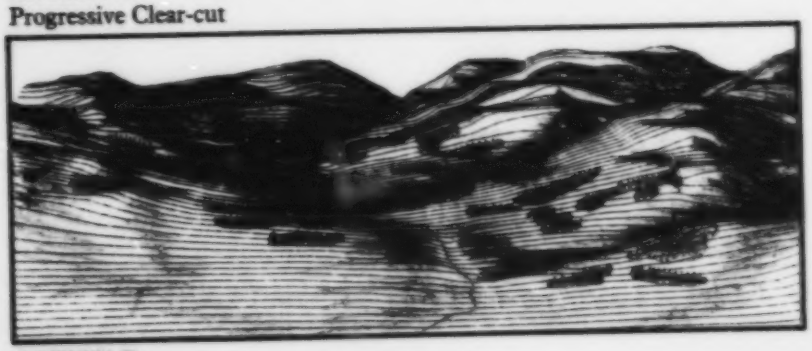
ACTION A
Aesthetic Layout



ACTION B
Alternate — Checkerboard Pattern



ACTION C
Progressive Clear-cut



ACTION D
Many, Small Blocks

5. Visual Management Actions

The VIA process can also be used to determine acceptable design and layout, and to devise measures to be taken upon completion of operations to reduce visual contrast.

The Visual Impact Assessment for a project may show that its appearance should be improved. The next step is to select visual management actions, which will minimize or mitigate impacts.

Three areas are to be considered:

1. Design and layout — line, shape, pattern, size, timing, cutting systems.
2. Operations — utilization, field modification.
3. Follow-up treatment — reclamation, scarification, reforestation.

It is important to consider the effect of time and the productivity of the site on the rate of visual recovery.

Viewing opportunity and level of concern are factors to consider in establishing an acceptable recovery period.

5.1 Design and Layout

Project design must consider all the elements of visual absorption capability. The basic elements of form, line, colour and texture can be assessed and the project manipulated to achieve acceptable degrees of contrast.

High contrast, poor blending and use of basic elements.

Design conforms with basic elements in the landscape.

5.1.1 Lineal Disturbances

Line Contrasts

Seismic lines, transmission lines and other lineal clearings are conspicuous in uniform coniferous stands. They can create a notched effect in the skyline.

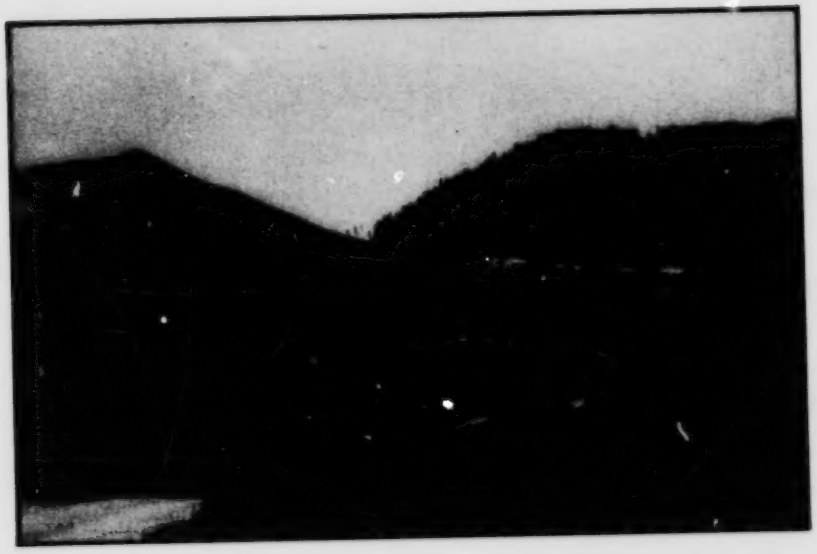
Horizontal or diagonal alignment reduces visibility and notching.

Seismic Line / Foothills Region

Attention of viewer is drawn by vertical alignment.

Avoidance of Steep Slopes

The linear disturbance of roads on side hills can be seen for great distances if cuts and fills are extensive. However, timber operations in Alberta generally avoid steep slopes, thus reducing road work which causes unfavourable visual impact.



Notched Skyline

Poor design, poor cleanup, unkept appearance

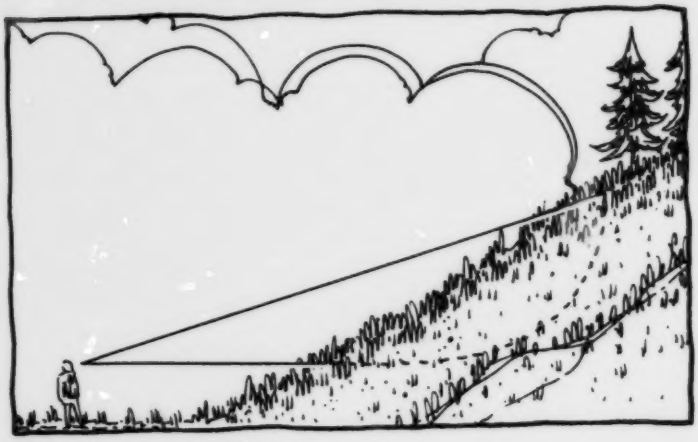
Skylighting

The treatment of a skylit ridge can have an important influence on its visual absorption.

The notching effect of lineal clearings, already mentioned, occurs if the main orientation of the clearing is along the line of sight. Sensitivity is raised for many years because the difference in tree height draws attention even after a new stand is established.

Individual trees left standing in a skylit clearing can create an unkept, wasteful appearance.

FIGURE 6
EFFECTS OF SCREENING



No forest cover, no screen.

Partial forest cover, partial screen.

Total forest cover, total screen.

5.1.2 Screening

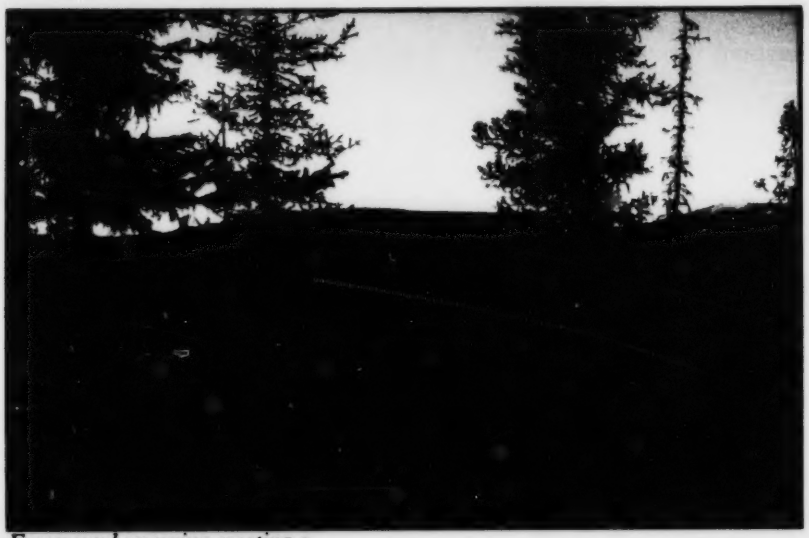
Visual buffers or screens are beneficial in distancing, softening or eliminating the influence of a land use activity. This raises the landscape's capacity to support multiple uses.

Screening will affect how much is seen in the view and may consist of landforms, vegetation or structures. Its effectiveness varies with its character (opacity or density) and size (height and width). Its influence is related to distance and view angle and is especially important in low viewing angles. Objects in the foreground will obscure large portions of the view, but farther away the effect diminishes.

Mature coniferous stands may not provide effective visual buffers at low viewing angles, as their open understory may allow a relatively clear view.

Clearing along a highway may be beneficial, improving variety and possibly opening views to distant features.

Foreground vegetation frequently forms the enclosure and provides focal points for very sensitive views, such as lakeshores. Retention of such key areas can also be of benefit to wildlife, recreation and soils management.



Foreground screening creating a framed view.

Foreground screening.

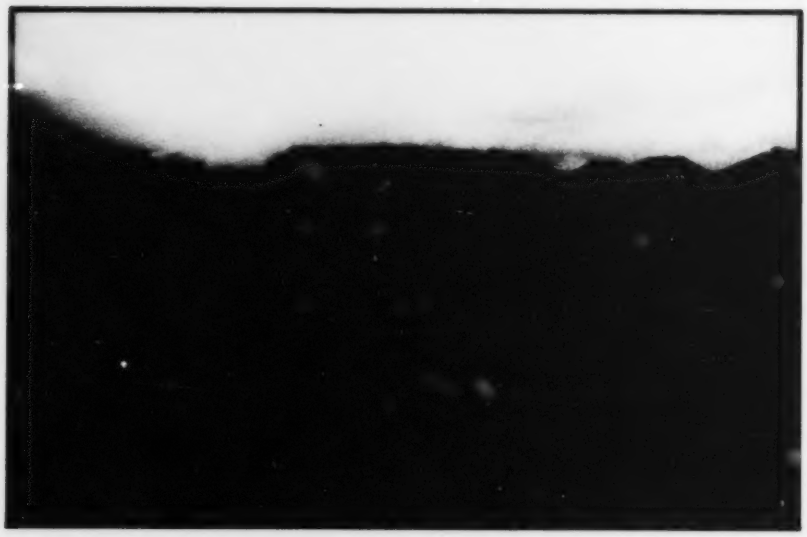
Stream side buffers.

Roadside screening.

5.1.3 Cutblock Shapes

Cutblocks will have an unnatural appearance if their shapes contrast with existing forms and lines in the landscape.

Blending can be achieved by one or more of the following:

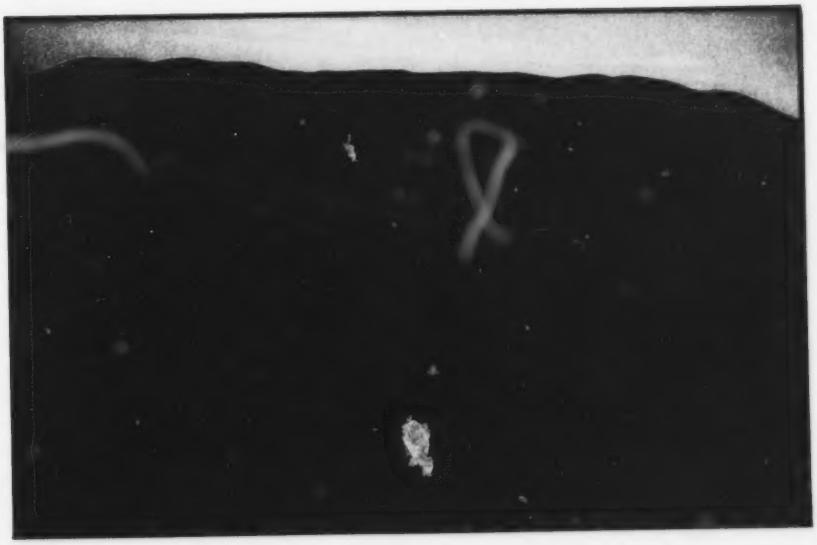


Offsetting Openings

Undulating Edges

Feathered edges — selective removal of larger trees along the edges of the block.

Using natural breaks in topography — a measure which can also improve the wind firmness of the remaining stands.



Type Cut

Distinct age classes and species diversity created through fire.

Type Cuts

Stand types and density strongly influence the pattern and form of openings. Open stands and areas with many natural openings will have a greater visual absorption capability.

Cutting patterns are affected by stand variability. Where fires have created distinct age classes and undulating forest type boundaries, the best cutting pattern both silviculturally and visually will conform to those boundaries. This layout also reduces the threat of windthrow in remnant stands.

5.1.4 Opening Size

In considering the visual impact of an alteration, size of opening is often the most important factor. The influence of size varies with existing conditions and variety of topography in the landscape, as well as viewing angle and distance. Acceptable sizes range widely, from the large scale of a landform approach to the much smaller than normal openings permitted in a retention landscape.

Opening size has a pronounced effect on the overall pattern of alteration in a view. Large numbers of small openings may create a mottled effect, while the large openings of a landform approach can sometimes contribute to unity in the landscape.

5.1.5 Cutting Systems

Two Pass System

A system for removal of timber in two stages generally works well but, in some circumstances, depending on visibility, slope, and rate of growth, can be either too liberal or too restrictive.

On large landforms in clear view, a cut system with only two passes may impose too many openings at once, creating a visual degradation.

Cutblock patterns can increase the overall impact. To some people a checkerboard pattern may appear as well-managed timber land, just as others appreciate agricultural patterns. On the other hand, in critical areas the influence of a rigid pattern can be quite severe.

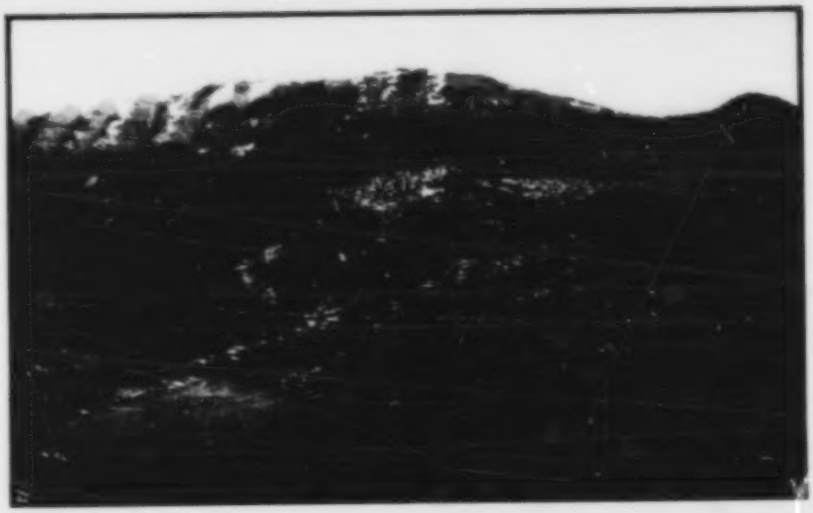
Some flexibility in key areas is necessary. Alternatives which might be appropriate for specific situations may include:

- block layout that is not rigid in block size or pattern, but conforms to the landscape.
- systems of three or more passes for long-term retention of stands in key positions.
- plans that retain flexibility for change.

Alternative Cutting Systems

In areas of high sensitivity and low VAC, such as the even-textured coniferous stands of the Eastern Slopes, alternatives to clear cutting may be explored.

Selective cutting is a possible alternative, but is a less suitable system than clear cutting, in relation to silvicultural requirements and stand re-establishment.



When planning harvests in areas of high and medium sensitivity, special attention should be given to improved design to balance the scale, shape and pattern of cutting. Together with early reforestation and reclamation of roads, this approach will soften impacts and reduce the time they endure.

Unbalanced Scale, High Impact From Roading

5.1.6 Timing

In many parts of Alberta, winter logging is by necessity rather than by preference. Operations in the winter have important environmental and visual benefits. For example, road building for winter harvesting causes little disturbance of the soil surface, and the roads are easily reclaimed or recontoured when operations have been completed.

Results of Logging During Adverse Ground Conditions

5.2 Operations

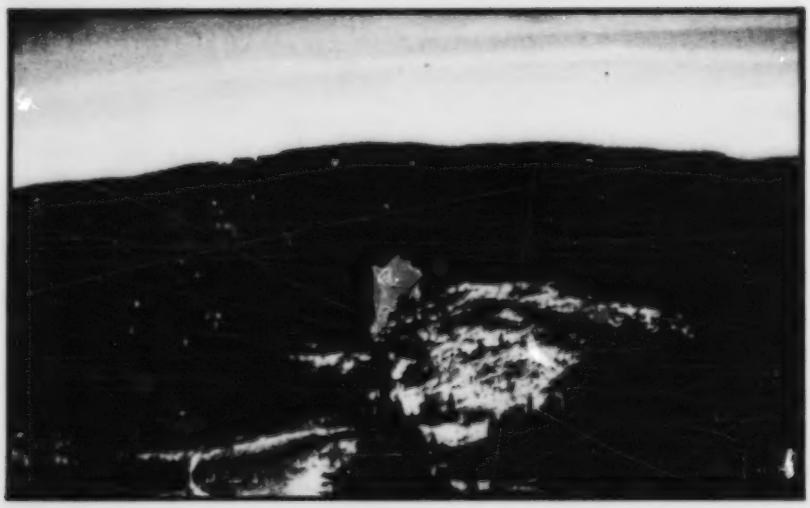
At this stage, final design alternatives can be selected to improve the fit of the project in the landscape.

Examples are:

Logging

- taking openings to a natural or windfirm break;

- undulating the edge of openings;



- minimize the extent of skid trails and roads, particularly in steep areas.

Small wood utilization in Alberta reduces the amount of waste and debris from the logging operation. Cleanup requirements ensure clean cutovers and landings.

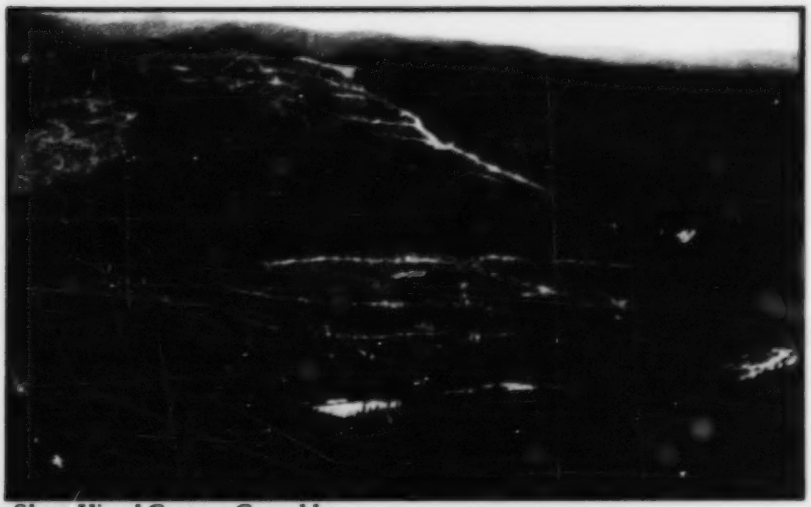
The overall quality of the operations, in respect to effect on aesthetics, should be examined at this stage. Wasteful practices, real or imagined, will adversely affect public acceptance of a project.

Field modifications may be introduced, if necessary, to improve actual logging practices which appear to be incompatible with visual quality objectives for the area.

Field Modification of Foreground Blocks May Have Improved Visual Quality.

Roads

- adjusting road locations including the placing of doglegs to break the line of sight into an alteration.



- reduce or minimize the size and amount of cut and fills on steep terrain.

Sharp Visual Contrast Caused by Excessive Roading

- remove debris and rehabilitate exposed areas.

5.3 Follow-up Treatment

After logging, measures taken to reduce contrast can effectively improve landscape quality and the public's acceptance of a project.

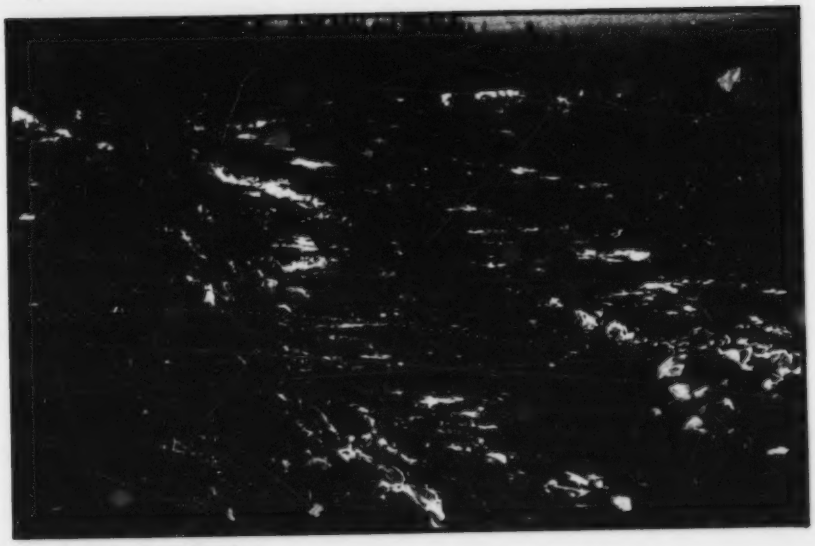
Before Reclamation

Reclamation

Abandoned roads and landings must be reclaimed to reduce the chance of erosion and the negative impact on open slopes. However, within forest stands right of way clearing remains obvious. Seeding to grass encourages quick visual absorption.

After Reclamation

Ripper Plow Scarification

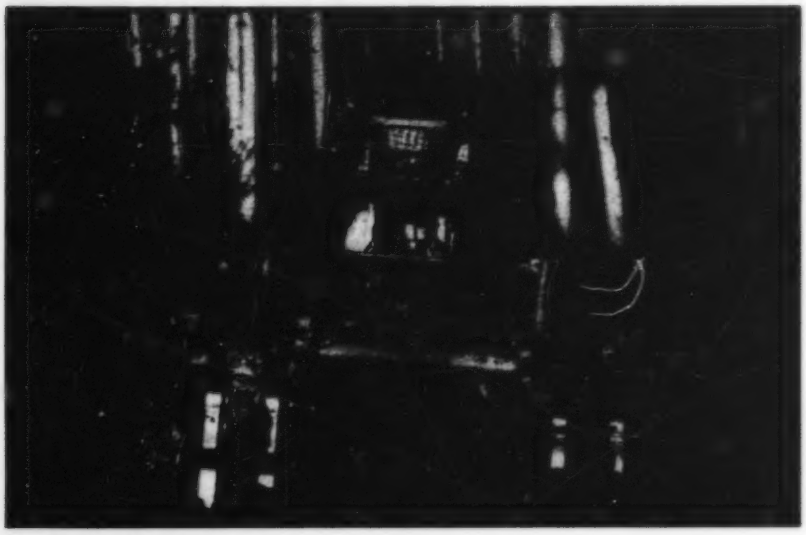


Brush Rake Scarification

Scarification

Disturbance of the top layer of soil is sometimes necessary to assist and hasten artificial or natural regeneration of logged areas.

Some scarification methods (brush rake, ripper plow) can destroy established understory vegetation and cause increased contrast in the short term. This loss of young trees and the barren appearance of the logged area are often the causes of public concern.



Bracke Scarification

Disc Trencher

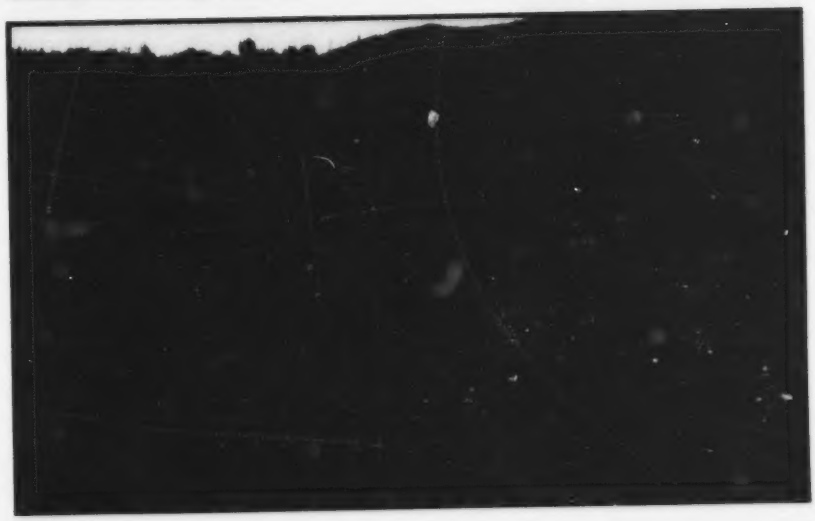
When other methods of scarification are employed (disc trencher, Bracke) damage to existing vegetation can be limited, avoiding negative impact and public reaction. Scarification can actually improve visual acceptability by breaking down and spreading unsightly accumulations of slash.

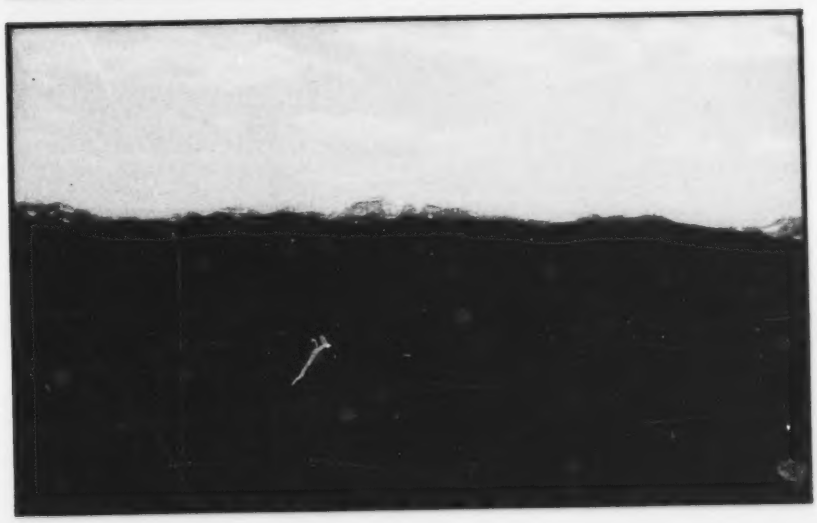
Reforestation

Regrowth of vegetation softens the contrast of land use alterations.

Normal reforestation requirements ensure that cutover areas will recover within a reasonable time. Successful reforestation must be achieved within 10 years of logging. Debris and disturbed soil generate a strong colour contrast. Increased growth of regeneration and vegetation creates a more pleasing effect to the eye, therefore, reforestation is a vital component of landscape management.

In most operations, only 50% of the merchantable timber is removed at one time, and there is a waiting period of about 20 years (or until the regeneration reaches 2 m in height) before the adjacent timber may be logged. These rules provide visual benefit by restricting the overall rate of development and encouragement of a green landscape.





5.4 Effect of Time

The ability of a site to recover over time has been identified as an important factor in visual absorption capability. Contrasts in colour and texture reduce over time until eventually no change is evident.

Areas that are adequately restocked may take many years to be visually apparent, or visually acceptable to the average user.

The Acceptable Height of Regrowth Will Vary With The Viewer.

6. Resource Management Decisions

Resource decisions are based on operational priorities in relation to legislation, policies, land use plans and zoning, and guidelines for resource management.

The relative values of each resource, identified at the inventory and referral stages, guide those decisions.

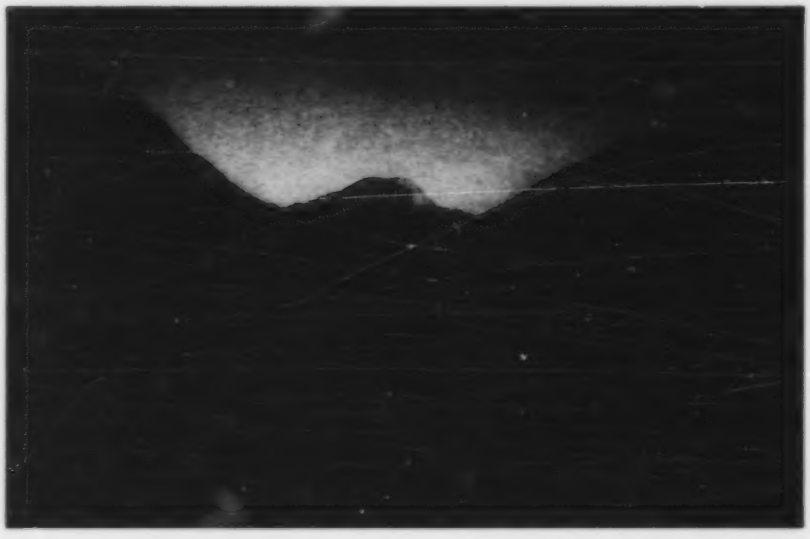
Consideration of visual resources should be a part of this process.

These landscape guidelines provide the methods by which the visual resources can be inventoried, their relative significance determined and their vulnerability to impairment assessed. This information will be included in comprehensive resource management decision-making.

Integration of Various Resource Uses

Fully informed decisions will ensure that:

- High value landscapes will be protected.
- Unnecessary visual impact will be avoided.
- Unavoidable impact will be reduced or mitigated.
- The capacity of the landscape for multiple uses will be increased.
- Public support and understanding will be improved.
- Economic diversity and non-economic benefits will be enhanced by the mix of resource extraction and amenity values.



Appendices

1. Physical Elements of a Viewshed:

There are four elements that compete for dominance in landscapes. These are colour, texture, line and form. They are revealed to us through the contrasts that their reflective surfaces produce.

A) Colour:

Can be described by two tonal qualities:

1) Hue — the reds, greens, yellows, blues etc.
2) Value — quality of colour — an object is either light or dark.

There are exceptions, but the following are common contrasts in colour value that can be called rough rules:

i) *sky* — is invariably lighter than earth elements — clouds being infrequent exceptions

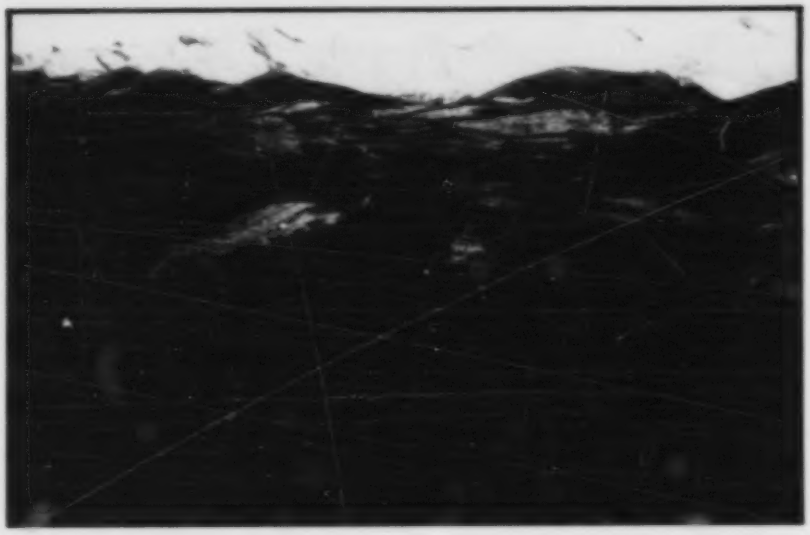
ii) *grasslands* — are lighter than tree or shrub cover

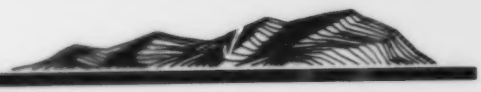
iii) *soil* — is likely to be lighter than tree or shrub cover, or only infrequently darker.

iv) *disturbed soil* — has a distinct value contrast compared to undisturbed soil or plant cover.

v) *hardwoods* — are generally lighter than conifers.

Overcast conditions or flat lighting diminishes value contrasts; intense or full light and seasonal changes increase value contrasts.





B) Visual Texture:

- The way and the amount of light an object reflects depends upon the structural properties of its surface.
- Light that strikes a rough, jagged surface will be scattered due to a variety of angular surfaces.
- Light which strikes a smooth, flat surface will be reflected with a minimum of scattering (e.g., a lake broken with waves compared with one that is calm).
- Texture is lessened with distance and atmospheric conditions.
- Textures are most obvious in side lighting and when light intensity is strong, casting distinct dark shadows.
- Strong side lighting increases the distance within which textures remain visible.

C) Line:

- The strength of line can decrease with distance due to atmospheric haze.
- Front lighting flattens form and reduces line strength so that often only the skyline remains evident.
- Side lighting accentuates the silhouettes and edges of separated forms.
- Back lighting blends forms of equal distance into one outline (e.g., mountain ranges).

D) Form:

- Shape and edge are terms that describe form.
- These terms relate to how they are silhouetted against space.
- The form of an object is its three-dimensional character.
- Shape is the two-dimensional impression that the form of an object may give.
- Sharp edge definition produces high contrast and a clear impression of shape.
- Subtle edge definition produces low contrast and a sense of continuity between the object and its surroundings.

Four factors that relate directly to, or affect the contrasts of the elements are direction of light, observer position, the fixation process and how the observer is exposed to the visual resource (sequence).

1.1 Direction of Light:

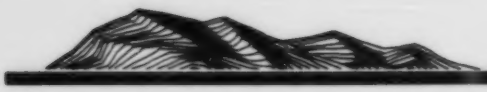
There are three sources:

i) Back Lighting — when facing the sun, makes details of the landscape and its surface become obscure. Top outside edges are emphasizes (early or late day light).

ii) Side Lighting — produces light and shadow patterns which emphasize the three-dimensional and textural characteristics of the visual resource (mid-day).

iii) Front Lighting — when the sun is to your back, shadows are short, shade falls away from the observer and more surface tends to be in full light.

- Form is accented by the presence of shade and shadow.
- North-facing slopes are more likely to be obscured by shade and shadow than south slopes.
- East or west slopes of comparable gradient can expect a similar amount of sun or shade (but at opposite times of the day).



1.2 Observer Position

- Describes the elevation of the observer relative to the object that is viewed (can be below, same or above) or observer inferior, normal or superior.

i) Observer Inferior:
- below the surrounding or nearby landscape
- usually when viewpoint is in a valley or canyon bottom
- in this position visual blockage occurs most often due to screening of plants, trees and landforms
- greatest control over screening effects
- this position suggests direction of attention to foreground detail, emphasis of small parts and screening of segments.

ii) Observer Normal:
- position is present when a level line of sight coincides with the dominating elements of the landscape.
- this position incorporates characteristics of both inferior and superior.

iii) Observer Superior:
- best description is a mountain summit or ridge top overview in which maximum opportunities are present for distant views and panoramas.
- this position minimizes visual blockage, is least restrictive with respect to limitations in enclosure, screening, direction or distance.

1.3 Fixation Process:

- Objects of the visual resources are scanned by means of exploratory movements. We may move our bodies to gain a better viewing location, our heads relative to our bodies, or our eyes relative to our heads.
- In scanning visible objectives our eyes invariably come to rest, or become fixed on the objects that create the greatest contrast in relation to adjacent objects.
- There is a hierarchy in how objects "catch" our attention:

i) Moving objects — those in the foreground dominating those in the middle or background.

ii) Figure objects — dominate because of size, shape, texture or tonal qualities.

iii) Subdued objects — subordinate to figure objects due to inferior size, shape, texture and tone.

- This process is used to predict what the public is most likely to see when the way we look at a visual resource is not entirely voluntary.

1.4 Sequence

- The sequence or order in which the visual resource is seen may be random and free — as in the case of the hiker who chooses his own travel directions — or it may be controlled and limited as in the case of a train traveller.
- In the controlled sequence, the variety of seen objects is limited strictly to those that occur in the visual corridor of the travel route.
- Actively plan for a variety-rich sequence of visual experiences when designing roads and cutblocks. Layout should reduce the adverse visual impact associated with road building and logging. The impact of these activities frequently depends upon people's perception, although the capability of the landscape to absorb the activity may play the larger role in obtaining acceptance.

Natural Feature

Artificial Feature

2. Visual Perception:

- We respond to our environment through our senses — the principal one of which is vision.
- Seeing is uniform in all individuals while perceiving differs considerably from individual to individual.
  - — Individuals exposed to the same scene from the same place have the potential of seeing the same objects but they may or may not perceive the objects similarly.
- Perceiving the visual resource relates to how we react as individuals to what we see. It is the process of evaluating what we do see in terms of what we have seen and what we expected to see.
- Seeing the visual resource relates to the physical factors of colour, form, line and texture that stimulate our sense of vision; each factor competing for dominance.
- The process of awareness and interpretation of what is seen and experienced is influenced by the physical factors and also by human factors such as emotion and intellect.
- We receive our impressions of the world around us approximately as follows:

  1.0% — taste
  1.5% — touch
  3.5% — smell
  7.0% — hearing
  87.0% — by sight

3. Human Factors

- We learn to form associations with a great variety of the objects we see.
- Classifications are made as to which of them may be considered dangerous or harmless, beautiful or ugly, valuable or worthless, unique or commonplace, desirable or undesirable, useful or useless etc.
- How we classify what we see depends on our individual knowledge of the physical world.
- How we interpret what we see tends to be subjective:

A) What we have seen is retained, both vaguely and concisely, and is influenced by our original sensitivity to the parts of the visual resource with which we have come into contact.

B) What we expect to see depends upon what we are led to believe and how these beliefs and mental images relate to what we have seen. This may be influenced by mental images we form from verbal and written information about unseen objects and places or the fragmented exposure through visual media.

C) What we do see is compared for recognition and evaluation with what we have seen and what we expected to see.

Strange objects will be mentally compared for correlation with objects that have generally similar physical characteristics.

- Common Perceptions:

1) The process of visual perception in which recall and expectation influence how we interpret objective reality is common to all of us. We all analyse the visible world similarly.

2) Our responses to natural objects are more predictable than our responses to artificial objects. We tend to accept the products of natural consequence more readily than we do the objects of artificial consequence (e.g., earthquakes, landslides, fire compared with timber harvesting or facility development).

3) The probability of visual appeal is higher for landscapes rich in variety than for landscapes that tend toward monotony because of their low object variety. Variety produces more visual stimulation.

4) Visual perception relies on visual stimulation — you must see objects in order to applaud or criticize.

5) Visual perception may be altered both positively or negatively by exposure to facts.

- We must learn to recognize our own perceptual limitations in managing the visual resource. What may appeal to our senses may not appeal to a critical public.

Source: USFS Landscape Management

Glossary

Aesthetic(s)
(a) Generally, the study, science or philosophy dealing with beauty and with judgments concerning beauty.
(b) Giving visual pleasure.
(c) The theory of perception or of perceptibility.

Background
The distant part of a landscape, picture, etc.; surroundings, especially those behind something and providing harmony or contrast; surrounding area or surface. Area located 8 km or greater from the viewer.

Basic Elements
Form, line, colour, and texture are the visual recognition parts which make up the characteristic landscape.

Blending
Combining into an integrated whole.

Characteristic
That which constitutes a character; that which characterizes; a distinguishing trait, feature, or quality; a peculiarity.

Characteristic Landscape
The naturally established landscape within a scene or scenes being viewed.

Contrast
Diversity of adjacent parts, as in colour, tone, or emotions.

Design
A deliberate plan or scheme to arrange elements so that a desired pattern results.

Detailed Assessment
A relatively intensive reconnaissance of a landscape or parts of a landscape.

Distinctive
Clearly marking a landscape or landscape feature as different from others.

Enhancement
A short-term management alternative used to raise the value, desirability or attractiveness of a landscape.

Focal
Drawing attention to a central item of interest.

Foreground
The detailed landscape found 1 km or less from the observer.

Forest Landscape
Landscapes in which the forest is the most dominant component.

Green-up
The process of re-establishment of vegetation following logging; usually herbaceous growth and deciduous trees appear first, followed by conifers.

Landscape
Land form and land cover forming a distinct pattern; portion of land that the eye can see in one glance.

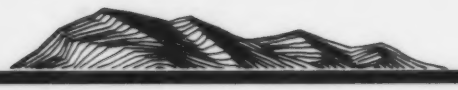
Landscape Feature
A distinct or outstanding part, quality or characteristic of a landscape.

Landscape Inventory
A record of visible landscapes, landscape features and an estimate of landscape sensitivity.

Landscape Management
The assessment, evaluation, design and manipulation of a landscape.

Landscape Sensitivity
Degree of landscape quality based on physical and viewer related factors.

Landscape Unit
An area indicating landscape similarity.



Middleground
The space between the foreground and the background in a picture or landscape. The area located from 1 km to 8 km from the viewer.

Modification
A Visual Quality Objective meaning human activity may dominate the characteristic landscape but must, at the same time, use naturally established form, line, colour and texture. It should appear as a natural occurrence when viewed in foreground or middleground.

Monotony
Complete repetition; tedious sameness.

Panorama
An unobstructed or complete view of a region in every direction; hence a complete and comprehensive view.

Perception
(a) People's impression of an object or space as based on past and/or anticipated experiences.
(b) Making oneself aware of all conditions and applicable factors; comprehension.

Preservation
A Visual Quality Objective that provides for ecological change only.

Rehabilitation
A short-term management alternative used to return existing visual impacts in the natural landscape to a desired visual quality.

Repetition
Units identical in interest and ability to attract attention, or at least identical in some characteristic.

Retention
A Visual Quality Objective which in general means human activities are not evident to the casual uninformed forest visitor.

Screening Effect
Hiding, restraining or protecting.

Selective Logging
The partial removal of trees within a forest.

Shape
Spatial form, often two-dimensional.

Silvicultural Practices
Activities that relate to and promote the rate and quality of tree growth.

Variety
A mixture or succession of different things, forms, or qualities, creating diversity within the visual environment.

View
A broad landscape or panorama looked toward or kept in sight; the act of looking toward this object or scene.

Viewpoint
Location from whence a landscape can be seen.

Viewshed
The visible area, as it appears from one or more viewpoints.

Vista
A confined view, especially one seen through a long passage, as between rows of houses or trees. A vista is often toward, or focuses upon, a specific feature in the landscape. Unlike a view, the vista is sometimes artificial and is thereby subject to design.

Visual
A mental image attained by sight.

Visual Absorption Capability (VAC)
The relative ability of a landscape to accept management manipulations without significantly affecting its visual character.

Visual Impact
An expression experienced by what is seen.

Visual Quality Objective (VQO)
A desired level of excellence based on physical and sociological characteristics of an area. Refers to degree of acceptable alteration of the characteristic landscape.

Visual Sensitivity
A measure of people's concern for landscapes.

List of References

Alberta. Energy and Natural Resources. 1984. A Policy for Resource Management of the Eastern Slopes: Revised 1984. Edmonton. ENR No. T/38.

_ _ _ _. 1981. Internal Referral Systems of Alberta Energy and Natural Resources. Edmonton. Inhouse Report. ENR No. Dept. 10.

_ _ _ _. 1985. Stream Crossing Guidelines — Operational Guidelines for Industry. Edmonton. ENR No. T/80.

_ _ _ _. Alberta Forest Service. 1982. Resource Road Planning Guidelines. Edmonton. ENR No. T/25.

_ _ _ _. 1979. The Resource Handbook. Edmonton. ENR No. 75.

_ _ _ _. 1977. Timber Harvest Cutblock Design. Edmonton. ENR No. T/116.

_ _ _ _. Alberta Forest Service. Timber Management Branch. 1985. Planning Process for Timber Harvesting. Edmonton. Unpubl. Rep.

_ _ _ _. Resource Evaluation and Planning Division. Resource Planning Branch. 1983. A System for Integrated Resource Planning in Alberta. Edmonton.

Crowe, Sylvia. 1978. The Landscapes of Forests and Woods. Forestry Commission Booklet 44. London.

Fairhurst, Kenneth B. 1984. A Landscape Assessment of the Hidden Creek Harvesting Proposal. Alberta Energy and Natural Resources. Unpubl. Rep.

Hackett, Brian. n.d. Landscape Planning, an Introduction to Theory and Practice. n.p.

Ivarson, Wayne D. n.d. Assessing Landscape Resources: a Proposed Model. In Zube et al. Landscape Assessment pp. 274-288.

Province of British Columbia. Ministry of Forests. 1981. Forest Landscape Handbook. Victoria.

Smardon, Richard C. n.d. The Future of Wetlands: Assessment the Visual-Cultural Values. n.p.

U.S. Department of Agriculture. Forest Services. 1973-1976. National Forest Landscape Management, Vols. 1, 2. Washington.

Yeomans, William C. 1983. Visual Resource Assessment — A User Guide. Surveys and Mapping Branch. B.C. Ministry of Environment.

Zube, Ervin H., Robert O. Brush, Julius Gy. Fabos. Landscape Assessment: Values, Perceptions, and Resources. Pennsylvania.